

Amendments to the Claims

Please cancel claims 3, 6 and 13-24. Please amend claims 1, 4, 7, 8, 12 and 25. Please add new claims 28-32. The currently pending claims after amendment are listed below.

1. (Currently Amended) A method of tracing the activity of an expression, said method comprising the steps of:
- (a) specifying a machine-implemented process in which a trigger expression is to be traced;
 - (b) specifying the trigger expression to be traced in the machine-implemented process;
 - (c) monitoring execution of said machine-implemented process to detect occurrences of a plurality of references to a location in machine memory representing a state of said trigger expression occurring as a result of executing said machine-implemented process;
 - ~~(c)~~ (d) responsive to each detected occurrence of a reference to said location in machine memory representing a state of said trigger expression, storing the respective state of the trigger expression when it is active at the time of the respective detected occurrence of a reference to said location in machine memory representing a state of said trigger expression to create a history of said trigger expression within the machine-implemented process, said storing step being performed without interrupting the machine-implemented process; and
 - ~~(d)~~ (e) restoring the state of the trigger expression when requested.

2. (Original) The method of claim 1, further comprising:
- (a) imposing a condition onto the trigger expression; and
 - (b) storing the state of the trigger expression only when the condition is satisfied.

3. (Cancelled)

1 4. (Currently Amended) The method of ~~claim 3~~ claim 1, further comprising:

- 2 (a) displaying the history such that the state of the trigger expression each time the trigger
3 expression was active can be displayed separately.

1 5. (Original) The method of claim 1, wherein the trigger expression is one which results in
2 an L value during the machine-implemented process.

6. (Cancelled)

1 7. (Currently Amended) The method of ~~claim 6~~ claim 1, wherein the ~~call to memory location~~
2 reference to said location in machine memory representing a state of said trigger expression is a
3 Read and/or a Write.

1 8. (Currently Amended) The method of claim 1, further comprising:

- 2 (a) specifying at least one attached expression;
3 (b) responsive to each detected occurrence of a reference to said location in machine
4 memory representing a state of said trigger expression, storing the respective state of
5 the at least one attached expression when the trigger expression is active at the time
6 of the respective detected occurrence of a reference to said location in machine
7 memory representing a state of said trigger expression, the states of the at least one
8 attached expression being associated with said history of said trigger expression
9 within the machine-implemented process; and
10 (c) restoring the state of the at least one attached expression when requested.

1 9. (Original) The method of claim 1, wherein the machine-implemented process is a
2 computer program.

10. (Original) The method of claim 1, as included in an object level trace program.

11. (Original) The method of claim 1, as included in a debug program.

12. (Currently Amended) A method of tracing the activity of an expression in an executing computer program, said method comprising the steps of:

(a) specifying the computer program in which a trigger expression resulting in an L value during the execution of the computer program is to be traced;

(b) specifying the trigger expression and any optional attachment expressions to be traced in the computer program;

(c) imposing a condition onto the trigger expression;

(d) monitoring execution of said computer program to detect occurrences of a plurality of accesses to a location in memory containing a state representing said trigger expression occurring as a result of executing said computer program;

(~~d~~) (e) responsive to each detected occurrence of an access to said location in memory containing a value representing said trigger expression, if said condition is satisfied, then storing the respective state of the trigger expression and any optional attachment expressions when the computer program has accessed a at the time of the respective detected occurrence of an access to said location in memory pertaining to containing a state representing the trigger expression and the conditions are satisfied to create a snapshot corresponding to the respective detected occurrence of an access to said location in memory, the step of storing being accomplished without interrupting the process;

(~~e~~) (f) creating a profile of the trigger expression comprising storing each snapshot;

(~~f~~) (g) displaying the profile such that each snapshot can be displayed separately; and

(~~g~~) (h) restoring the state of each snapshot, when requested.

13-24. (Cancelled)

1 25. (Currently Amended) An article of manufacture, comprising a data storage medium
2 tangibly embodying a program of machine readable instructions executable by an electronic
3 processing apparatus to perform method steps for operating an electronic processing apparatus,
4 said method steps comprising the steps of:

5 (a) initiating a user interface to exchange data input/output with a user and an electronic
6 processing apparatus;

7 (b) requesting a trigger expression from a user;

8 (c) requesting a program identification of a program in which the trigger expression is to
9 be traced;

10 (d) causing the electronic processing apparatus to execute the identified program;

11 (e) monitoring execution of the identified program to detect occurrences of a plurality of
12 references to a location in memory representing a state of said trigger expression
13 occurring as a result of executing the identified program;

14 (e) (f) responsive to each detected occurrence of a reference to said location in memory
15 representing a state of said trigger expression, storing the respective state of the
16 trigger expression each time a memory operation occurs to at the time of the
17 respective detected occurrence of a reference to said location in memory representing
18 a state of the trigger expression to create a corresponding respective snapshot, said
19 snapshots forming a history of said trigger expression during the executing execution
20 of the identified program, said storing step being performed without interrupting or
21 otherwise stopping execution of the identified program ~~as a snapshot~~;

22 (f) (g) maintaining the capability to restore each snapshot and display each snapshot to the
23 user.

1 26. (Original) The article of manufacture of claim 25, further comprising:

- 2 (a) requesting the user to assign conditions to the trigger expression whereupon when the
3 conditions are satisfied, a snapshot of the trigger expression is stored.

1 27. (Original) The article of manufacture of claim 25, further comprising:

- 2 (a) requesting the user to indicate attached expression whose states are also stored in a
3 corresponding snapshot whenever a snapshot is stored for the trigger expression.

1 28. (New) A digital data processing device, comprising:

- 2 (a) at least one processor;
3 (b) a memory functionally connected to said at least one processor;
4 (c) a first computer program executable by said at least one processor;
5 (d) at least one input device receiving input from a user and at least one output device for
6 presenting output to a user;
7 (e) a second computer program for tracing said first computer program, said second
8 computer program: (i) receiving a specification of a trigger expression used by said
9 first computer program from said user using said at least one input device; (ii)
10 monitoring execution of said first computer program to detect occurrences of a
11 plurality of references to a location in said memory representing a value of said
12 trigger expression occurring as a result of executing said first computer program; (iii)
13 responsive to each detected occurrence of a reference to said location in said memory
14 representing a value of said trigger expression, storing a corresponding snapshot
15 containing state data of said first computer program, said state data including said
16 trigger expression, said storing step being performed without interrupting said first
17 computer program; (iv) creating a history of said trigger expression during execution
18 of said first program from said snapshots; and (v) presenting said history to said user
19 using said at least one output device.

1 29. (New) The digital data processing device of claim 28, wherein said second computer
2 program further receives a specification of at least one condition for capturing said snapshot, and
3 performs said step of storing a corresponding snapshot containing state data of said first computer
4 program only if said at least one condition is satisfied.

1 30. (New) The digital data processing device of claim 28, wherein said second computer
2 program further received a specification of at least one attachment expression, and responsive
3 thereto, includes said at least one attachment expression in said state data.

1 31. (New) The digital data processing device of claim 28, wherein the first computer program
2 and the second computer program execute on the same computer.

1 32. (New) The digital data processing device of claim 28, wherein the first computer program
2 and the second computer program execute on separate units connected by a data communications
3 link.